

IN THE CLAIMS:

Claims 1 through 65 have been amended herein. All of the pending claims 1 through 65 are presented below. This listing of claims will replace all prior versions and listings of claims in the application. Please enter these claims as amended.

1. (Amended) A solid pyrotechnic composition having a total weight, the solid pyrotechnic composition comprising:
about 40 weight percent to about 90 weight percent oxidizer particles, the oxidizer particles having a mean particle size of not greater than about 30 microns and comprising ~~(a)~~ at least one member selected from the group consisting of alkali metal nitrate and ammonium nitrate and ~~(b)~~ at least one member selected from the group consisting of alkali metal perchlorate and ammonium perchlorate; and
organic crystalline particles and optionally one or more salts of the organic crystalline particles, the organic crystalline particles and the one or more optional salts of the organic crystalline particles accounting for about 10 weight percent to about 60 weight percent of the total weight of the solid pyrotechnic composition.

2. (Amended) ~~A~~ The solid pyrotechnic composition according to claim 1, wherein the oxidizer particles comprise potassium nitrate.

3. (Amended) ~~A~~ The solid pyrotechnic composition according to claim 1, wherein the oxidizer particles comprise potassium perchlorate.

4. (Amended) ~~A~~ The solid pyrotechnic composition according to claim 1, wherein the mean particle size of the oxidizer particles is in a range of 5 microns to 20 microns.

5. (Amended) ~~A-The~~ solid pyrotechnic composition according to claim 1, wherein the oxidizer particles constitute 65 weight percent to 80 weight percent of the solid pyrotechnic composition.

6. (Amended) ~~A-The~~ solid pyrotechnic composition according to claim 1, wherein 0.5 weight percent to 30 weight percent of the total weight of the solid pyrotechnic composition consists of the at least one member selected from the group consisting of alkali metal perchlorate and ammonium perchlorate.

7. (Amended) ~~A-The~~ solid pyrotechnic composition according to claim 1, wherein 5 weight percent to 20 weight percent of the total weight of the solid pyrotechnic composition consists of the at least one member selected from the group consisting of alkali metal perchlorate and ammonium perchlorate.

8. (Amended) ~~A-The~~ solid pyrotechnic composition according to claim 1, wherein 5 weight percent to 20 weight percent of the total weight of the solid pyrotechnic composition consists of potassium perchlorate.

9. (Amended) ~~A-The~~ solid pyrotechnic composition according to claim 1, wherein the organic crystalline particles comprise at least one member selected from the group consisting of phenolphthalein and an organic crystalline compound derived from a reaction between a phenolic compound and phthalic anhydride.

10. (Amended) ~~A-The~~ solid pyrotechnic composition according to claim 1, wherein the organic crystalline particles comprise phenolphthalein.

11. (Amended) ~~A-The~~ solid pyrotechnic composition according to claim 10, wherein 13 weight percent to 22 weight percent of the solid pyrotechnic composition consists of phenolphthalein and optionally a salt of phenolphthalein.

12. (Amended) ~~A-The~~ solid pyrotechnic composition according to claim 1, wherein the organic crystalline particles and the one or more optional salts of the organic crystalline particles have a mean particle size not greater than about 30 microns.

13. (Amended) ~~A-The~~ solid pyrotechnic composition according to claim 1, wherein the organic crystalline particles and the one or more optional salts of the organic crystalline particles have a mean particle size not greater than 15 microns.

14. (Amended) ~~A-The~~ solid pyrotechnic composition according to claim 1, wherein the solid pyrotechnic composition has a weight ratio of the organic crystalline particles to the one or more optional salts of the organic crystalline particles of at least 80:20.

15. (Amended) ~~A-The~~ solid pyrotechnic composition according to claim 1, wherein the solid pyrotechnic composition is free of the one or more optional salts of the organic crystalline particles.

16. (Amended) ~~A-The~~ solid pyrotechnic composition according to claim 1, further comprising a ~~non-hygroscopic~~nonhygroscopic polymeric binder, the ~~non-hygroscopic~~nonhygroscopic polymeric binder having a moisture uptake of not more than 4 weight percent at 75 percent relative humidity ~~and at a temperature of~~ at a temperature of 21.1°C (70°F) over a period of 24 hours.

17. (Amended) A-The solid pyrotechnic composition according to claim 16, wherein the ~~non-hygroscopic~~nonhygroscopic polymeric binder constitutes no more than about 10 weight percent of the total weight of the solid pyrotechnic composition.

18. (Amended) A-The solid pyrotechnic composition according to claim 16, wherein the ~~non-hygroscopic~~nonhygroscopic polymeric binder constitutes 3 weight percent to 6 weight percent of the total weight of the solid pyrotechnic composition.

19. (Amended) A-The solid pyrotechnic composition according to claim 16, wherein the ~~non-hygroscopic~~nonhygroscopic polymeric binder comprises poly(vinyl acetate).

20. (Amended) A-The solid pyrotechnic composition according to claim 16, wherein the ~~non-hygroscopic~~nonhygroscopic polymeric binder comprises at least one member selected from the group consisting of ethyl cellulose and nylon.

21. (Amended) A-The solid pyrotechnic composition according to claim 16, wherein the ~~non-hygroscopic~~nonhygroscopic polymeric binder comprises at least one member selected from the group consisting of poly(vinyl acetate-co-vinyl alcohol), nylon, poly(ethylene-co-vinyl acetate), polyethylene glycol, nitrocellulose, and chain-extended BAMO.

22. (Amended) A-The solid pyrotechnic composition according to claim 1, wherein the solid pyrotechnic composition is free of sulfur and charcoal.

23. (Amended) A-The solid pyrotechnic composition according to claim 1, wherein the solid pyrotechnic composition has a moisture uptake of not greater than 0.25 weight percent at 75 percent relative humidity ~~and~~at a temperature of 21.1°C (70°F) over a period of 24 hours.

24. (Amended) ~~A~~The solid pyrotechnic composition according to claim 1, wherein the solid pyrotechnic composition is formulated to have, upon ignition, a theoretical flame temperature not greater than 2300K.

25. (Amended) ~~A~~The solid pyrotechnic composition according to claim 1, wherein the solid pyrotechnic composition is formulated to have, upon ignition, a theoretical flame temperature in a range of 1750K to 2300K.

26. (Amended) A solid pyrotechnic composition having a total weight, the solid pyrotechnic composition comprising:
about 40 weight percent to about 90 weight percent oxidizer particles, the oxidizer particles having a mean particle size of not greater than about 30 microns and comprising at least one member selected from the group consisting of alkali metal perchlorate and ammonium perchlorate, and optionally comprising at least one member selected from the group consisting of alkali metal nitrate and ammonium nitrate; and
organic crystalline particles and optionally one or more salts of the organic crystalline particles, the organic crystalline particles and the one or more optional salts of the organic crystalline particles accounting for about 10 weight percent to about 60 weight percent of the total weight of the solid pyrotechnic ~~composition,~~composition;
wherein about 20 weight percent to about 90 weight percent of the solid pyrotechnic composition consists of the at least one member selected from the group consisting of alkali metal perchlorate and ammonium perchlorate.

27. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein the oxidizer particles comprise the at least one member selected from the group consisting of alkali metal nitrate and ammonium nitrate.

28. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein the oxidizer particles comprise potassium nitrate.

29. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein the oxidizer particles comprise potassium perchlorate.

30. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein the mean particle size of the oxidizer particles is in a range of 5 microns to 20 microns.

31. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein 30 weight percent to 90 weight percent of the total weight of the solid pyrotechnic composition consists of the at least one member selected from the group consisting of alkali metal perchlorate and ammonium perchlorate.

32. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein 30 weight percent to 90 weight percent of the total weight of the solid pyrotechnic composition consists of potassium perchlorate.

33. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein 65 weight percent to 80 weight percent of the total weight of the solid pyrotechnic composition consists of the oxidizer particles.

34. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein the organic crystalline particles comprise at least one member selected from the group consisting of phenolphthalein and an organic crystalline compound derived from a reaction between a phenolic compound and phthalic anhydride.

35. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein the organic crystalline particles comprise phenolphthalein.

36. (Amended) ~~A~~The solid pyrotechnic composition according to claim 35, wherein 13 weight percent to 22 weight percent of the solid pyrotechnic composition consists of phenolphthalein and an optional salt of phenolphthalein.

37. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein the organic crystalline particles and the one or more optional salts of the organic crystalline particles have a mean particle size not greater than about 30 microns.

38. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein the organic crystalline particles and the one or more optional salts of the organic crystalline particles have a mean particle size not greater than 15 microns.

39. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein the solid pyrotechnic composition has a weight ratio of the organic crystalline particles to the one or more optional salts of the organic crystalline particles of at least 80:20.

40. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein the solid pyrotechnic composition is free of the one or more optional salts of the organic crystalline particles.

41. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, further comprising a ~~non-hygroscopic~~nonhygroscopic polymeric binder, the ~~non-hygroscopic~~nonhygroscopic polymeric binder having a moisture uptake of not more than 4 weight percent at 75 percent relative humidity ~~and at a temperature of 21.10C (700F)~~ over a period of 24 hours.

42. (Amended) ~~A~~The solid pyrotechnic composition according to claim 41, wherein the ~~non-hygroscopic~~nonhygroscopic polymeric binder constitutes no more than about 10 weight percent of the total weight of the solid pyrotechnic composition.

43. (Amended) ~~A~~The solid pyrotechnic composition according to claim 41, wherein ~~non-hygroscopic~~nonhygroscopic polymeric binder constitutes 3 weight percent to 6 weight percent of the total weight of the solid pyrotechnic composition.

44. (Amended) ~~A~~The solid pyrotechnic composition according to claim 41, wherein the ~~non-hygroscopic~~nonhygroscopic polymeric binder comprises poly(vinyl acetate).

45. (Amended) ~~A~~The solid pyrotechnic composition according to claim 41, wherein the ~~non-hygroscopic~~nonhygroscopic polymeric binder comprises at least one member selected from the group consisting of ethyl cellulose and nylon.

46. (Amended) ~~A~~The solid pyrotechnic composition according to claim 41, wherein the ~~non-hygroscopic~~nonhygroscopic polymeric binder comprises at least one member selected from the group consisting of poly(vinyl acetate-co-vinyl alcohol), nylon, poly(ethylene-co-vinyl acetate), polyethylene glycol, nitrocellulose, and chain-extended BAMO.

47. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein the solid pyrotechnic composition is free of sulfur and charcoal.

48. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein the solid pyrotechnic composition has a moisture uptake of not greater than 0.3 weight percent at 75 percent relative humidity ~~and~~at a temperature of 21.1°C (70°F) over a period of 24 hours.

49. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein the solid pyrotechnic composition has a moisture uptake of not greater than 0.25 weight percent at 75 percent relative humidity ~~and~~at a temperature of 21.1°C (70°F) over a period of 24 hours.

50. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein the solid pyrotechnic composition is formulated to have, upon ignition, a theoretical flame temperature greater than 2300K.

51. (Amended) ~~A~~The solid pyrotechnic composition according to claim 26, wherein the solid pyrotechnic composition is formulated to have, upon ignition, a theoretical flame temperature in a range of 2300K to 3000K.

52. (Amended) A method of making a solid pyrotechnic composition having a total weight, the method comprising:

- (a) ~~—~~combining an alkali metal hydroxide with at least one organic crystalline compound to produce a solution comprising a salt of the at least one organic crystalline compound;
- (b) ~~—~~combining the solution with nitric acid to form alkali metal nitrate particles and to convert the salt back to the at least one organic crystalline compound in particulate form, the alkali metal nitrate particles and the at least one organic crystalline compound in particulate ~~form~~form, each having a mean particle size of not greater than about 30 microns; ~~and~~
- (e) ~~—~~combining the alkali metal nitrate particles and the at least one organic crystalline compound in particulate form with additional oxidizer particles to form ~~the~~a pyrotechnic composition, the additional oxidizer particles having a mean particle size of not greater

than about 30 microns and comprising at least one member selected from the group consisting of alkali metal perchlorate and ammonium perchlorate, the additional oxidizer particles optionally also comprising at least one member selected from the group consisting of alkali metal nitrate and ammonium nitrate; and

(d) ~~optionally drying the pyrotechnic composition and obtaining to obtain the solid pyrotechnic composition;~~ optionally drying the pyrotechnic composition;

wherein about 40 weight percent to about 90 weight percent of the total weight of the solid pyrotechnic composition consists of the alkali metal nitrate particles and the additional oxidizer particles.

53. (Amended) ~~A-~~The method according to claim 52, wherein the alkali metal nitrate particles comprise potassium nitrate.

54. (Amended) ~~A-~~The method according to claim 52, wherein the additional oxidizer particles comprise potassium perchlorate.

55. (Amended) ~~A-~~The method according to claim 52, wherein the at least one organic crystalline compound comprises phenolphthalein.

56. (Amended) ~~A-~~The method according to claim 52, wherein the solid pyrotechnic composition is free of the salt of the at least one organic crystalline compound.

57. (Amended) ~~A-~~The method according to claim 52, further comprising adding a ~~non-hygroscopic~~nonhygroscopic polymeric binder, the ~~non-hygroscopic~~nonhygroscopic polymeric binder having a moisture uptake of not more than 4 weight percent at 75 percent relative humidity ~~and at a temperature of 21.1°C (70°F)~~ at a temperature of 21.1°C (70°F) over a period of 24 hours.

58. (Amended) ~~A~~The method according to claim 52, wherein the solid pyrotechnic composition is free of sulfur and charcoal.

59. (Amended) A method of making a pyrotechnic composition having a total weight, the method comprising:

- (a) combining an alkali metal hydroxide with at least one organic crystalline compound to produce a solution comprising a salt of the at least one organic crystalline compound;
- (b) combining the solution with perchloric acid to form alkali metal perchlorate particles and to convert the salt back to the at least one organic crystalline compound in particulate form, the alkali metal perchlorate particles and the at least one organic crystalline compound in particulate ~~form~~form, each having a mean particle size of not greater than about 30 microns; ~~and~~
- (c) combining the alkali metal perchlorate particles and the at least one organic crystalline compound in particulate form with additional oxidizer particles to form ~~the~~a pyrotechnic composition, the additional oxidizer particles having a mean particle size of not greater than about 30 microns and comprising at least one of (i) at least one member selected from the group consisting of alkali metal nitrate and ammonium nitrate and (ii) at least one member selected from the group consisting of alkali metal perchlorate and ammonium perchlorate; and
- (d) optionally drying the pyrotechnic composition ~~and obtaining the~~to obtain a solid pyrotechnic ~~composition,~~composition;

wherein about 40 weight percent to about 90 weight percent of the total weight of the solid pyrotechnic composition consists of the alkali metal perchlorate particles and the additional oxidizer particles.

60. (Amended) ~~A~~The method according to claim 59, wherein the additional oxidizer particles comprise potassium nitrate.

61. (Amended) ~~A~~The method according to claim 59, wherein the alkali metal perchlorate particles comprise potassium perchlorate.

62. (Amended) ~~A~~The method according to claim 59, wherein the at least one organic crystalline compound comprises phenolphthalein.

63. (Amended) ~~A~~The method according to claim 59, wherein the solid pyrotechnic composition is free of the salt of the at least one organic crystalline compound.

64. (Amended) ~~A~~The method according to claim 59, further comprising adding a ~~non-hygroscopic~~nonhygroscopic polymeric binder, the ~~non-hygroscopic~~nonhygroscopic polymeric binder having a moisture uptake of not more than 4 weight percent at 75 percent relative humidity ~~and~~at a temperature of 21.1°C (70°F) over a period of 24 hours.

65. (Amended) ~~A~~The method according to claim 59, wherein the solid pyrotechnic composition is free of sulfur and charcoal.

IN THE DRAWINGS:

Accompanying this Response to Restriction Requirement and Election of Species and Preliminary Amendment is a Letter to the Chief Draftsman submitting proposed revisions to FIG. 1. Approval of the revised figure is respectfully requested. Also enclosed is a Transmittal of Formal Drawings with formal drawings revised as proposed.